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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/986,134	11/07/2001	Rodolfo Antonio Gomez	545/50645	4659

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CROWELL & MORING LLP
INTELLECTUAL PROPERTY GROUP
P.O. BOX 14300
WASHINGTON, DC 20044-4300

EXAMINER	
WILKINS III, HARRY D	
ART UNIT	PAPER NUMBER
1742	

DATE MAILED: 03/07/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/986,134	GOMEZ, RODOLFO ANTONIO	
	Examiner	Art Unit	
	Harry D Wilkins, III	1742	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 January 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-10* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-10* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *07 November 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Double Patenting

1. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970);and, *In re Thorington,* 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

2. Claims 1-6 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1, 3, 16 and 19 of U.S. Patent No. 6,475,653 in view of Takahashi (US 4,515,674) (for claims 1-6), Meyers et al (for claims 2 and 3) and Applicant's admission of prior art (for claim 5). Although the conflicting claims are not identical, they are not patentably distinct from each other because the claims of '653 teach a compound (composite) electrode that has an inner electrical conductor and an outer electrical conductor with an electrically conductive material, an ionic or semiconductor membrane, sandwiched there between. However, the claims of '653 do not teach that the outer electrode encloses at least one end of the inner electrode. Takahashi teaches (see figures 4 and 5 and col. 10, lines 39-56) to completely envelop an inner electrode piece within an outer electrode piece. Takahashi teaches (see col. 2, lines 50-64) that the reason for this set-up is to prevent dissolution

of the inner electrode piece. This set-up also prevents the electrolyte from contacting the inner electrode piece. Therefore, it would have been obvious to one of ordinary skill in the art to have adapted the compound electrode of the claims of '653 to have the outer electrode piece completely enclose at least one end of the inner electrode piece as taught by Takahashi because doing so would prevent the inner electrode piece from contacting the electrolyte.

Regarding claims 2 and 3, the claims of '653 do not teach that the sandwiched electrically conductive material is a gel or liquid. However, Meyers et al teach (see col. 1, line 56 to col. 2, lines 40) that a gel electrolyte is used to replace solid or liquid electrolytes because it has higher conductivity and stability. Meyers et al also teach (see col. 1, line 64 to col. 2, line 19) that liquid electrolytes were used to replace solids because of increased conductivity over the solid electrolytes. Therefore, it would have been obvious to one of ordinary skill in the art to have substituted a liquid or gel electrolyte for the solid electrolyte of Gomez and Takahashi because Meyers et al teach that the liquid and gel electrolytes have higher conductivities, thus allowing for a higher rate of power transfer (through lower resistance).

Regarding claim 4, claim 3 of '653 recites that the sandwiched material is an ionic or semiconductor membrane.

Regarding claim 5, the claims of '653 are silent as to a high specific surface area being formed on the outer surface of the outer electrode. However, Applicant admitted as prior art, see remarks filed 6 October 2003 at pages 10-11, that high specific surface area electrodes were well known in the prior art, and were used to increase the reaction

rate of the electrochemical reaction and to reduce the energy consumption rate. Therefore, it would have been obvious to one of ordinary skill in the art to have applied a high specific surface area surface as taught by Applicant's admission to the outer surface of the outer electrode of Gomez in view of Takahashi in order to increase the reaction rate and to reduce the energy consumption rate.

Regarding claim 6, claim 1 of '653 states that the outside of the electrodes are coated with a catalyst.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claim 9 is rejected under 35 U.S.C. 102(b) as being anticipated by Mazanec et al (US 5,693,212).

Mazanec et al teach (see Figs. 9 and 10 and col. 17, lines 27-46) a composite electrode with a cylindrical inner electrode 52 and a cylindrical outer electrode 53 surrounding the inner electrode with an electrically conductive material 51 sandwiched there between, with electrical leads 56 and 57 for inlet and outlet of electrons. The composite electrode includes an inner anode cell 54 inside the inner electrode and an outer cathode cell 55 surrounding the outer electrode. While there is no express disclosure of means for feeding and withdrawing each of the anolyte and catholyte, the apparatus inherently possesses such means as there must be some way of adding the

anolyte and catholyte to be processed and to evacuate the processed anolyte and catholyte so that the apparatus can be continued to be operated.

The structure of Mazanec et al meets each and every structural limitation of the present claim.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1, 4, 6, 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gomez (WO 99/12220) in view of Takahashi (US 4,515,674).

Gomez teaches (see page 11, lines 7-18 and figure 2) a composite electrode that has an inner electrical conductor 7, contained in an outer electrical conductor 5. There between is sandwiched an electrically conducting material 6, such as an ionic or semiconductor membrane. There are electrical leads 9 and 8 to the inner and outer electrodes, respectively.

Gomez does not teach that the outer electrode encloses at least one end of the inner electrode.

However, Takahashi teaches (see figures 4 and 5 and col. 10, lines 39-56) to completely envelop an inner electrode piece within an outer electrode piece. Takahashi teaches (see col. 2, lines 50-64) that the reason for this set-up is to prevent dissolution

of the inner electrode piece. This set-up also prevents the electrolyte from contacting the inner electrode piece.

Therefore, it would have been obvious to one of ordinary skill in the art to have adapted the composite electrode of Gomez to have the outer electrode piece completely enclose at least one end of the inner electrode piece as taught by Takahashi because doing so would prevent the inner electrode piece from contacting the electrolyte.

Regarding claim 4, Gomez teaches (see page 11, lines 12-13) that the sandwiched material 6 is an ionic or semiconductor membrane.

Regarding claim 6, Gomez teaches (see page 11, line 8) that the outside of the electrode is coated with a catalyst 4.

Regarding claim 7, Gomez teaches (see figures 2 and 4 and the paragraph spanning pages 11 and 12) an electrochemical cell having an anode cell 22 and a cathode cell 16, each with an electrode 17, which may be the composite electrode described above, wherein the inner electrode 7 is contained in the outer electrode 5. The electrochemical cell has a DC power source 21 connected to the second ends of the two electrodes (due to the direction of flow of electrons, the cathode cell must necessarily be attached to the negative terminal and the anode cell to the positive terminal). The second ends (B in figure 2) are attached to the outer electrode. The first ends (i.e.-inner electrodes) of the electrodes are electrically connected to each other, and the cell contains means to deliver electrolyte to the anode cell and means 18 to

transfer the discharge of the anode cell to the cathode cell and means 19 to transfer the discharge of the cathode cell to the anode cell.

Regarding claim 8, Gomez teaches (see figures 2 and 5 and page 12, lines 5-15) an electrochemical cell having an anode cell 32 and a cathode cell 33, each with an electrode 24, which may be the composite electrode described above, wherein the inner electrode 7 is contained in the outer electrode 5. The electrochemical cell has a power connection 25 connected to the second ends of the two electrodes (due to the direction of flow of electrons, the cathode cell must necessarily be attached to the negative terminal and the anode cell to the positive terminal). The second ends (B in figure 2) are attached to the outer electrode. The first ends (i.e.-inner electrodes) of the electrodes are electrically connected to each other, and the cell contains means 30 to deliver neutral electrolyte to the anode cell and means 27 to transfer the activated anolyte from the anode cell and means 31 to deliver neutral electrolyte to the cathode cell and means 28 to transfer the activated catholyte from the cathode cell.

However, Gomez does not teach the power connection is a DC power source because the apparatus operates as a fuel cell. However, it would have been obvious to one of ordinary skill in the art to have performed an electrolysis reaction in the apparatus of Gomez instead of a fuel cell reaction by changing load 25 to a DC power source 26.

7. Claims 2 and 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gomez in view of Takahashi as applied above to claims 1, 4, 6 and 7 and further in view of Meyers et al (US 3,708,220).

The teachings of Gomez and Takahashi are described above.

Gomez and Takahashi do not teach that the sandwiched electrically conductive material is a gel or liquid.

Meyers et al teach (see col. 1, line 56 to col. 2, lines 40) that a gel electrolyte is used to replace solid or liquid electrolytes because it has higher conductivity and stability. Meyers et al also teach (see col. 1, line 64 to col. 2, line 19) that liquid electrolytes were used to replace solids because of increased conductivity over the solid electrolytes.

Therefore, it would have been obvious to one of ordinary skill in the art to have substituted a liquid or gel electrolyte for the solid electrolyte of Gomez and Takahashi because Meyers et al teach that the liquid and gel electrolytes have higher conductivities, thus allowing for a higher rate of power transfer (through lower resistance).

8. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gomez in view of Takahashi as applied to claims 1, 4, 6 and 7 above, and further in view of Applicant's admission of prior art.

The teachings of Gomez and Takahashi are described above.

Gomez in view of Takahashi do not teach that the outer surface of the outer electrode has "a high specific surface area" as claimed.

However, Applicant admitted as prior art, see remarks filed 6 October 2003 at pages 10-11, that high specific surface area electrodes were well known in the prior art,

and were used to increase the reaction rate of the electrochemical reaction and to reduce the energy consumption rate.

Therefore, it would have been obvious to one of ordinary skill in the art to have applied a high specific surface area surface as taught by Applicant's admission to the outer surface of the outer electrode of Gomez in view of Takahashi in order to increase the reaction rate and to reduce the energy consumption rate.

9. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mazanec et al (US 5,693,212).

The teachings of Mazanec et al are described above.

There is no express disclosure in Figures 9 and 10 in Mazanec et al of end caps and tangential feeding means. However, the figures do not include the full apparatus, including the feeding and withdrawal means.

Thus, it would have been within the expected skill of a routineer in the art to have added end caps so as to contain the anolyte and catholyte within the chambers 54 and 55 and also to make the end caps insulating to prevent charge leakage between the anode and cathode. In addition, it would have been within the expected skill of a routineer in the art to have adapted the means for feeding the anolyte to feed the anolyte in any conventional manner, such as tangentially. (see Gomez US 5,882,502, especially Fig. 4A, for support that tangential feeding was conventional).

Response to Arguments

10. Applicant's arguments filed 14 January 2005 have been fully considered but they are not persuasive. Applicant argued that:

a. The disclosure and claims of Gomez et al (both US 6,475,653 and WO 99/12220) teach that the anode electrode and cathode electrode have an outer current collector which is coated with a catalyst and that this arrangement is not provided for in the presently claimed invention.

In response, nothing in the present claims excludes the presence of a catalyst coating on the outer current collector. This can particularly be seen by the subject matter of present claims 5 and 6.

b. Takahashi is related only to a single terminal electrode.

In response, while this is true, Takahashi is reasonably pertinent because the disclosure of Takahashi describes enclosing an inner conductive portion with an outer conductive portion for preventing the inner conductive portion from contacting the electrolyte. This has the advantage of avoiding interactions between the electrolyte and the inner conductive portion.

c. Mazanec et al teach a solid electrolyte and thus does not provide for an anolyte and a catholyte.

In response, the two separate reaction chambers of Mazanec et al represent the anolyte cell and catholyte cell. The solid electrolyte in the middle of the electrodes is equivalent to the electrically conducting material of the present claim. While there is no express disclosure in Mazanec et al of means for feeding and withdrawing anolyte and catholyte, one of ordinary skill in the art was well aware that the disclosed cell in figures 9 and 10 of Mazanec et al do not include the entire cell. There would inherently be some means for individually feeding and withdrawing reactants to each of the anolyte

and catholyte cells. The apparatus taught by Mazanec et al meets the claimed structure.

Conclusion

11. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Harry D Wilkins, III whose telephone number is 571-272-1251. The examiner can normally be reached on M-Th 10am-8:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy V King can be reached on 571-272-1244. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Harry D Wilkins, III
Examiner
Art Unit 1742

hdw

ROY KING
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700